Space Weather Forecast

Issued on Saturday, 21 May 2022 at 01:27 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: R1-R2 Radio Blackouts likely with Moderate-class X-ray flares. Slight chance of Strong flares and R3 Radio blackouts.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate in the last 24 hours with one Moderate class flare observed, from the largest and magnetically very complex sunspot region located in the northern central disc. Despite its size and significant magnetic complexity, it is not showing signs of growth and appears to be mature and stable, with flare activity remaining somewhat muted. There are six other sunspot regions on the Earth-facing disc, which are much smaller in size and magnetic less complex, and are generally stable or diminishing. No Earth directed CME's have been analysed, but a long duration Common class flare around 20/1300 UTC produced a weak CME. If adequate imagery is available an analysis will be undertaken to determine if the CME is Earth directed.

Solar Wind / Geomagnetic Activity: The solar wind, as measured remained predominantly at elevated levels, approximately 540-580 km/s, but peaked at strong levels at 20/1541 UTC at 608 km/s. This was under the influence of an enhanced solar wind from a coronal hole feature in the western hemisphere of the Sun. The magnetic field of the solar wind was weak, as was the important north-south component of the solar winds magnetic field. Geomagnetic activity was Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background, with no enhancement from the Moderate flare that occurred. Consequently no solar radiation storms occurred.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Moderate, with further M-class flares, and a slight chance of an isolated Strong-class flare (R3 Radio Blackout). The main source of the activity is probably from the large and magnetically very complex sunspot in the western hemisphere, and with a lower chance from the remaining regions. Various filaments can also be observed within the western hemisphere, these will need to be monitored for any potential lift-offs.

Solar Wind / Geomagnetic Activity: Solar winds are expected to remain elevated today (21st), and probably becoming temporarily strong, under the influence of a coronal hole feature, before slowly declining through the following days. Geomagnetic activity is forecast to be Quiet to Unsettled, but with isolated Active periods likely today and overnight.

Energetic Particles / Solar Radiation: The energetic particle count rate is expected to remain at background levels but a large sunspot region, currently Earth-facing, has the potential to trigger strong flares, giving an increased chance of solar radiation storms.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	10	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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